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Editorial.

Educational Reform. For the last few years there has been an insistent cry for a radical change in the system of elementary and secondary education in this country. Everybody seems to realize that the existing system does not satisfy the needs of the taught, but few, if any, are in a position to give concrete suggestions for framing a workable scheme connecting the various links in the chain. The proposals which have been recently placed before the public in a Madras Government communique should therefore strike those interested in the matter as something original if not interesting, at least as far as this presidency is concerned. We do not propose to discuss the proposals in any detail at present but would like to touch on one or two points directly concerning the agricultural aspect—if we may say so—of the suggested reforms.

One of the chief factors, which has acted as a drag on our propaganda work is most certainly the illiteracy of the farmer—we do not mean the *Mirasdar* or mere landowner but the actual cultivator—with whom our propaganda officers have to deal. During all these sixty and odd years since agricultural education on western lines was instituted in this presidency we have been attempting to manufacture a class of farmers from out of the educated landed gentry who have, neither by tradition nor inclination anything in common with the 'man behind the plough,' and with what result? Our chief aim, viz., to induce the educated people to take up private farming has so far remained unrealized. This has perhaps been the experience in other countries as well so far as collegiate education in agriculture is concerned. These colleges have produced men qualified more for manning the departments of agriculture, as research officers or propagandists. But what about the short courses modelled on lines common in the West where men, women and boys actually engaged in farming take the fullest advantage of these institutions. Why are not these, started a few years back, in some of the farms in our Presidency not taken better advantage of by the farming classes than at present? Why were the vernacular agricultural middle schools not a success?

The answer is that the training which was intended for the benefit of the agriculturists could not be availed of by them because they had not had even a very rudimentary training in the so called three R's. On the other hand in the West where we have copied these systems from, compulsory primary education, without wastage before the minimum school-going age is reached, has created a class of farmers who are capable of taking advantage of the various opportunities offered to the educated farmer for improving his lot. Look at the large number of agricultural journals published for the benefit of the farmers—not too technical but concerning more about the day to day routine of farming life, on livestock and crops, containing pages after pages of questions and answers from actual farmers, regarding their difficulties and how they were in actual practice surmounted etc. etc. And where are we, still in the days of magic lanterns and coloured posters!! If only the agricultural classes had the necessary elementary education we are sure things would have been very different from what they are now. We do not confine this remark to agricultural improvements alone. It is therefore none too early for the authorities concerned to launch upon a bold policy of primary and secondary education on or similar lines indicated in the Government memorandum.

We have not got the details of the new Intermediate course suggested in the reformed scheme. But some modifications may perhaps have to be made in the present B. Sc. Ag. course in consequence, if and when the reform comes. It is now over sixteen years since the degree course was instituted in this college and it would be well to consider whether all is well with the present state of affairs. Changes in the syllabus, in examination etc., were brought about more than once during the last few years. We are however of opinion that the whole course could be modified with advantage still further. At present the course extends for three years. The standard of "Pure sciences" is certainly high and could any day compare most favourably with that in the other colleges in India or elsewhere; but as far as application or utility in after life, of the present course of study is concerned we are sure there could be improvement. With this in view and in accordance with the system followed in similar institutions in India and elsewhere we would suggest that the general course may be made complete in itself within two years with another year's specialisation in any two subjects, the degree to be conferred as at present at the end of three years. We are led to think that undue stress is laid and more than necessary time is allotted to subjects like Veterinary Science and Zoology. One year should be enough for learning first-aid in the former and getting a working knowledge of insect pests and their habits and anything more is not to be expected from an all round agricultural man regarding these subsidiary sciences. The syllabus may perhaps be on the same lines as for the L. Ag.

course in vogue prior to 1914 with the modification of specialising on any two of the following :— Horticulture, Dairying, Farm Management and Economics, Agricultural propaganda, Plant pathology, Agricultural Entomology, Agricultural Chemistry, Agricultural Bacteriology, Soil Physics, Agricultural Botany, Genetics, Agricultural Engineering, etc.

The final university product with this modified course of training will, we are sure, be very much better equipped for the work of a demonstrator, research worker or even a private farmer than the present graduates who get a general training in everything with no chance of specialising in any particular branch. The present day tendency is for specialisation whether in purely literary, scientific or professional education and it is high time that our college also provides facilities for our graduates to specialise in their favourite subjects thus enabling them to give the finishing touch to their scholastic career here alone instead of having to go elsewhere for the purpose as some of our men are now forced to do.

We dare say everybody interested in the matter would admit that there is a necessity for a change in our college curriculum on more or less the above lines and in view of the impending changes in the arts courses from primary up to the college classes we invite the earnest attention of all concerned to our suggestions. We have only just drawn a faint outline of the picture leaving it to the experts to fill in the details.

METHODS OF RURAL RECONSTRUCTION WORK DONE BY THE AMERICAN ARCOT MISSION AGRICULTURAL INSTITUTE, KATPADI.

BY S. A. KANAGASUNDARAM,

Vice Principal and Farm Manager, Agricultural Farm, Katpadi.

I take this opportunity of thanking the Madras Agricultural Students' Union for inviting the American Arcot Mission to take part in the lively activities of this conference. Perhaps some of you might have heard of and some have seen the American Arcot Mission Agricultural Institute, Katpadi. It is located about 4 miles away from the main Katapadi—Bangalore road. As one goes along the road winding in and out of the numerous barren knolls which are a feature of the tract, one wonders whether any farm can have its existence in such a place, but the visitor is amply rewarded at the end by the presence of a beautiful farm, demonstrating how best such an inhospitable and barren land can be made to attract and yield. This was made possible entirely due to the pioneer and untiring efforts of Mr. and Mrs. J. J. De Valois who have put their heart and soul into this project. I shall now, go through the past, the present and the future of the Institute.

The Past. The American Arcot Mission has never forgotten the importance of the rural life of India in all its fulness and of the lines of spiritual, mental, physical, social and economical aspects of it. In pursuance of this policy, in 1918 it was decided to fit in the economic aspect, as rural conditions demanded. So, need for work in Agriculture was felt and a plan was presented to the Government and a trained Agricultural hand was also appointed to be in charge. This led the Reformed Church in America to raise \$ 14,900 and to send Mr. and Mrs. J. J. De Valois to India.

The Government offered the Mission 175 acres of land near Katpadi. In 1923 the missionary house was built and occupied. A vigorous programme of work was then carried out, such as digging of wells, laying out plots, bunding and tracing the fields, planting of trees, providing quarters for the staff and building of the school and hostel. The first batch of boys were admitted in 1924. The period from 1923 to 1930 was mainly a pioneering one and gave valuable experience in chalking out for the programme of work.

The Present Activities. *Poultry Raising.* A leading part in the development of the improved poultry farming has been taken in the Presidency. The foundation stock of our pens is a flock of 197 adult birds imported from England and America. Well over a thousand birds are at the farm besides the innumerable ones sent to various

parts of India and outside countries like Burmah, Siam and Arabia. Our aim is to make poultry raising a subsidiary industry enabling the poor villagers to add a little to their income. Almost all the villages round about Katpadi are now having pure and cross bred birds earning a part of their livelihood through the sales of eggs at our Rural Development Egg Marketting Centre at Katpadi.

Cattle Breeding. "Cattle is the back-bone of the farmer in India" but in almost all the villages, the specimens found are such as to evoke one's sympathy. Breeding is haphazard, there being no regular organization. To raise the standard of the milch and draft animals, breeding bulls and buffaloes have been stationed under the Government premium scheme at various places round about our farm for the benefit of the villagers. Apart from the *Scindhi* and *Kangayam* stud bulls stationed at the Farm, the Institute has sent out about a dozen bulls to the villages round about the farm for breeding purposes and as the result every year more than 600 cows are served and at least 500 calves are born to the pure bred sires of both the breeds.

Goat Rearing. There are nearly 11 million goats in the presidency, but they are of non-descriptive variety. Goat's milk though a valuable food is not in general use as an article of food. Goat is "the poor man's cow, in as much as eight milking goats can be kept on the amount of feed that one cow would require."

There are two breeds of goats *Surity* and *Jumnapari*. These pure bred bucks are made to cross with the country goats to grade up the country breed. As the result we have now in the villages and in the farm about 100 cross-bred goats. Many are sold for a higher price than the country ones. Thus the villagers have begun to realise the benefits of goat breeding. The goats have gone not only to many places within the district but also to many other districts. The institute is expecting the final sanction for a scheme of goat breeding from the Imperial Council of Agricultural Research, New Delhi. The Institute with a view to make a quick propagation has lent out about 100 goats on *Varam* system in many of the villages. Associated with this the problem of fodder is tackled and we are using pit and trench silos with success in addition to the cultivation of fodder crops.

Conservation and Use of Manure. Not to speak much about the very low humus content of our land we have to admit the considerable loss of it through ignorance and negligence. Proper preservation of cattle manure by the loose box, dry earth, the manure pit and compost systems and the growing of green manure crops are all regular items of demonstration in our farm.

Improved Implements. Improvements which will meet the desired end and do not involve much expenses to the ryot are being incorporated in the local implements, and labour saving methods of cultivation and irrigation are practised.

Diversified farming. Paddy, the staple crop is produced under the most uneconomical conditions in these tracts. To make the farmer work better, to find him work all round the year and to provide himself and his family a better diet, cultivation of fruits and vegetables is being advocated.

Rural Community, Agricultural bias, middle school. In 1930 this phase of activity was begun at the farm. There is a hostel which provides accommodation for over 70 village boys, and over 80 day-scholars attend the school from the neighbouring villages. Government syllabus is followed allowing them to continue higher studies. Both theoretical and practical courses are given to these boys on dry and wet crops, home and market gardening and animal husbandry. All the students do two hours practical work daily on the farm and are able to raise by their own effort enough vegetables and fruits and also to produce sufficient quantity of milk, eggs and grain. The educational value of such a programme is very striking indeed. After finishing this three-year course, which provides an agricultural bias, some of these boys take teachers' training and become teachers in the villages while others take up cultivation or other work in their own villages, thereby creating a really efficient source for enlightened village life under the "Back to the village" system. Though the farm is located in a secluded spot, the attention of people engaged in rural development has been drawn to it and we get a steady stream of visitors and ryots. Some of them stay for a few days and get thoroughly acquainted with all the activities of the farm, while others exchange ideas of mutual benefit.

Summer School and Short Courses. A 'Summer School' was started in 1929. The villager who found his work slack, was invited to undergo a short course at the farm. Our object was to infuse a desire for a better village life and living. Thus the students of the Summer School were adult men and women teachers, farmers and local leaders. These were given short courses on the scientific methods of cultivation, preservation of manure, poultry raising, and other cottage industries. Entertainments, dramas and *bajanas* were conducted at regular intervals.

Extension work done by the boys and village scouting. In addition to the regular school work, the staff and students of the school have selected three different villages and done some work under the following methods. The school is closed on a Friday morning, the staff and the boys are divided into three groups reach the village by walk and make the necessary preparation for their stay for two days in the village. On Friday evening a variety entertainment is given to the public containing lessons on uplift work. On the following morning the boys all dress in Khaki, go about the village and give practical demonstrations such as conservation of manure by the dry earth

system, digging of manure pits, and cleaning of wells. They go about with spades and crowbars, and repair the street roads. In the evening the boys enact a drama on a subject like health, temperance or uplift work which usually lasts to the dawn of the next day. After doing some more work on Sunday they return to the farm on Sunday night to begin the regular school work on Monday. This is done by the staff, including the principal, their families and all the students. This is done three times in a year. The result is many, of the village people have understood the value of conserving manure and to keep their streets and wells clean.

Rural Development Centre, Katpadi. On Mondays, Wednesdays and Saturdays eggs are brought from at least 20 villages and they are tested and graded by electricity and are despatched to different places by rail. Eggs are supplied to different places, hotels, stores, agents and to individual families in different grades and at different rates. To some clients more than 40 dozen eggs are being sent on alternate days and a regular supply of 60 dozen is made twice a week to the Madras Civil Orphan Asylum. By this the poor villagers make a lot of profit and we promise to take all the eggs that they can produce. Cloth is bought in large quantities direct from the mills at Madras and are sold both as cloth and ready-made dress at rates cheaper than the usual bazaar prices. By this the poor villagers are benefited. Fruits and vegetables, such as tomatoes, papayas, guavas and brinjals are brought to the Centre from the villages and are sold to the customers thus helping the marketing of the produce of the villagers. There is a Rural Circulating Library from which many villagers are benefited. The same hall is used as a free reading room which has one English paper, one Tamil paper and a good number of English and American magazines. A family is set apart for the Centre work, the husband being in charge of marketing and the wife in charge of the library and reading room. One of our staff is set apart to supervise the work done in the villages on all these lines at regular intervals. During the past year our Marketing Centre has purchased over 72,000 eggs from the village people paying them over Rs. 2000 for the same. Over 1000 books on various subjects have been circulated and read in the villages through our circulating library.

Work done by the Agricultural Institute under the North Arcot District Economic Council. In accordance with this scheme, work is being done by introducing poultry and stud goats in many of these centres. Exhibits were taken to all these centres during the Village week celebrations, lectures were given during the public meetings under the chairmanship of the respective Revenue divisional officers, strongly emphasizing the methods of poultry raising and its benefits. A special lecture was delivered at the Ryots' Conference held at Vaniyambadi under the presidency of S. A. Venketaraman Esq., I. C. S. the district collector of North Arcot and the president

of the District Economic Council. The Economic Council has sanctioned Rs. 3000 for three years at Rs. 1000 per year. The Institute thanks the Council and its president for the financial help and for the opportunity given to the Institute to do this piece of work for the improvement of the villages.

In addition to the exhibitions held in all the eleven model villages in connection with the village week celebrations under the District Economic Council there were three special exhibitions held during the year.

On the 12th. and the 13th. March 1937 a big exhibition was held at the Rural Development Centre at Katpadi in a specially erected *pandal*. The Animal Show of the S. P. C. A. of Vellore was combined with this exhibition. Many of the Government Departments i. e., Agriculture, Veterinary, Cooperative (button factory, ratan work, shoe making etc.), Fisheries and the Red Cross society took part, bringing their exhibits also. The Assistant Director of Agriculture held the inspection of the breeding bulls and conducted a ploughing competition on the exhibition grounds. There was a great show of poultry, goats, cows, calves, grains, fruits, vegetables etc. and prizes were awarded. Sports and games were conducted. A radio was set up and entertained the public for two days. Public processions were conducted with music with the bulls, goats, fowls etc, through the town. A public meeting was held over which the District Collector presided. The principal gave a report of the work and Miss G. Dodd gave away the prizes which consisted of valuable brass vessels and other useful utensils.

More or less the same programme was followed at the Rural Exhibition at Ponnai Anecut in Walaja Taluk, Ranipet Division on the 19th. and 20th. April 1937 where hundreds of village people camped with their families under thatched sheds. Ploughing competition, sports and games, poultry crops, fruits and vegetables were all exhibited and the usual prizes were given away. On the 22nd. and 23rd. April 1937 the same kind of exhibition was held at Virudampet near Vellore on the banks of the river Palar.

The Future: Goat breeding scheme for the production of a better breed, by crossing *Jumnapari* and *Suriti*, the reputed heavy milk yielders and good meat producers with the local selected stock is an important one and we are attempting to do this work with the help and cooperation of the Imperial Council of Agricultural Research, for South India in general and with the guidance of the North Arcot District Economic Council for the district in particular.

More intensive work on the above lines and the development of all the present activities with the help of the Development Department are our future plans.

Summary. Statistics are dry reading but may be the best way to sum up accomplishments of the past. We have imported 137 fowls from America and England through the years in order to build up our poultry. We have terraced and bunded 60 acres of land and brought it under cultivation. Where in the beginning we had only palmyra trees with no shade even for a poultry run, to-day we have 1000 mango, 60 guava, 80 papaya, 135 lime, 123 orange, 50 coconut and 300 tamarind trees a total of 1,800 fruit trees, not to mention the thousands of shade, fuel and avenue trees in addition. We have 2000 fowls on the farm; we own 32 cattle and breeding bulls; our herd of goats has grown from 15 does in 1932 to over 100 to-day. Our registers show over 600 services a year by our breeding bulls and we have trained 182 men and women in our Summer schools. We now have a complete Higher Elementary School with 155 boys and girls and a staff of seven well qualified teachers. A total of about 600 boys and girls have attended and passed through our school during the past years. Our finances are met by the Mission funds and from the Government grants and we thank the Government for the support rendered to us.

Conclusion. I wish to conclude this paper with the fervent hope that God may bless this piece of work which is slowly but steadily progressing. It is our earnest hope and prayer that God and man will cooperate in this glorious work and do their part to bring the thousands of villages of our dear mother land of India to a better condition in all its phases of work. Let India attain first the *Swaraj* of rural uplift, freed from the dangerous clutches of drink, dirt, debt and disease.

"Let us be on the alert and be prepared to do our best."

"Let our actions speak louder than our words."

"God helps those that help themselves."

ADULT EDUCATION FOR RURAL RECONSTRUCTION

BY J. N. JAYAKARAN,

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After several years of experimentation in rural reconstruction work, we, workers of the Y. M. C. A., came to definite conclusions regarding the fundamental principles that must be recognised by any programme which aims at lasting success.

Rural uplift becomes impossible if service is directed to one or two or more, but not all of the villager's needs. The programme has to be sufficiently comprehensive and its execution simultaneously directed to all his main needs. In other words, it is practically futile to confine rural work to the economic, the health, the social, the moral or any other needs of the villager. Success is possible only when all sides of rural life are approached and that simultaneously.

Rural reconstruction is impossible except in so far as it is a process which is worked from within. All work directed from without is transitory and has value only so far as it secures action by and from within the village itself. When this is forgotten, much of the services that is done, however valuable in itself, is quickly lost. Not only is it a waste, but also it undermines faith and retards normal progress. All rural reconstruction work should be severely conceived and carried out as a species of education. Not education in the ordinary sense; but as Adult Education irrespective of literacy. That is the only method that is really possible or justifiable. Every line of service should be conceived and worked out as a part of education. Take for instance, co-operative credit. Even that service should not be worked out merely as a banking concern for providing relief to individual villagers from the grip of the usurious money-lender, but as an educational agency in regard to economic values and joint action, and for education and training in rural leadership. It is one thing to work the co-operative society as a bank and a totally different thing to work it as an educational agency even when confining that education to purely economic affairs. In the same way, service along all other lines should be thought out and carried out as various means of one central process of adult education. This will mean slower and more difficult work, but everything that is done will abide and become creative in its turn.

It is a fallacy that adult education should begin with conferring literacy and then proceed to build on it more or less along lines of modern school education for the young. Should literacy be indispensable for adult education, we must give up the task at once. Happily, literacy is not indispensable to education which in its broad sense is only the transference of ideas from one to another. And this can be done in more ways than one. In the situation in India, with our problems so many, so diverse, so complicated, so urgent, and all the time becoming more and more grave with the steady and enormous increase of population, we indeed have no time to wait for the literacy of our people, but have to endeavour by all means to perfect a system of adult education irrespective of literacy. In all our plans and programmes the query should be, how much will the illiterate person get out of this? If the literate person gets more, it is all to the good. But the test should be the effect on the illiterate person. Nothing should be reckoned as satisfactory or sufficient which benefits only the literate and leaves the illiterate aside. It is not meant, however, that the conferring of literacy should not be designed as a part of the general curriculum of adult education. It need not be given a central place.

We must remind ourselves that we are dealing in our villages with one of the most settled communities in the whole world which is now

finding it almost impossible to adjust itself to modern requirements and standards which have come upon it with an insistence which is a challenge and a help. The process must be operative from the innermost citadel of what was once a completed structure and still remains a substantial one though battered on many sides. The resources for its reconstruction must be provided as far as possible from within the village and the real workers must arise there. Our part is merely providing the necessary education towards that end.

There are in village life several admirable institutions which can be turned to excellent account in the carrying out of such an educational scheme.

The Weekly Market. In India, this is a ready-made adult school. Practically, the whole village is there; and the same set of people flock there week after week. Any one who hires a few stalls and offers something attractive gets his chance freely with the whole crowd. Striking exhibits and charts should be displayed and simple talks related to a present problem, say, for instance, the price of groundnut or a pest which attacks a standing crop, given. More general topics can be introduced gradually in the course of the discussion of the specific problem of the villager. Lecturers are not difficult to get. In every district the Government has experts in several lines which are of practical importance to the villager. But they do not go about all the time to teach the rural folk. They do things if and when called upon to do so. In fact, most of the villagers do not even know about the existence of such experts. Some prominent place in the weekly market is a very natural means of bringing the two together. Looking at the exhibition and the charts and listening to the simple talks, the villager is naturally challenged by the advantage which comes from literacy. He can and does get an enormous amount of information and suggestion through the eye and the ear though he is not able to read and write. But he comes almost every week to a situation when he observes the advantages of those who are literate. He begins to crave for that advantage at least for his children. This effect is analogous to what has been proved to have happened among the Negroes of the United States when the peripatetic schools from Hampton and Tuskegee went among them.

The weekly market lends itself to continuous instruction in sufficient detail, as it is mostly conducted in the form of questions and answers. So, the results can be gauged and judged from time to time. Sale of better implements, seeds and fertilisers, poultry and bees and other things which we wish to introduce, can be done. Every such transaction is an occasion for more questions and answers. Books, pamphlets, bulletins and leaflets can be received and issued on that occasion.

In all these operations one should constantly keep in mind the educational aspect. As far as possible, our share should be confined to guidance. The actual work should be shared more and more and finally taken over entirely by the villagers themselves.

The Village School. The day school is for the young. The teacher's duty is supposed to come to an end in the evening when the pupils have left. The building is kept shut for the night. What an opportunity for Adult Education commences just then! The teacher could come back at lighting time when the village folk have returned from their daily toils. Talks, lectures, songs, *bhajan*s, lantern shows, classes, readings from newspapers, bulletins or pamphlets—anything can be done provided two wants are satisfied, namely,

(a) Our teachers' training schools should prepare rural schoolmasters to consider their schools as community centres and to work them as such.

(b) Assistance should be given to those schoolmasters by people like us to keep this side of their work up to the standard.

The Village Theatre. No village in our country appears to be incapable of improvising a theatre even at short notice for entertainment purposes. The traditional means of adult education employed for thousands of years in our country is music, song and story. A combination of these in the dramatic form is the most effective means for reaching the whole community, young and old, men and women. The didactic purpose has not detracted from the artistic standard of the drama. Plays with a purpose like *Harischandra* and *Nandanar* judged on purely artistic merit compare very well with the front rank productions of any literature. Therefore in the revival of the drama which is now preceding, we find some of our best talents interested in the writing of new plays suited to the needs and tastes of the present generation; and it should be our endeavour to keep the material improved all the time and to give the villager always the very best available. We should be having newer plays written all the time and they should be better every time. The main aim being education, the play should clearly convey certain ideas which are practicable to-day to the villager as he is. These special ideas which a play aims to convey should be in song form and set to popular and easy tunes. Then they catch the attention, grip the memory, and circulate in all the villages, literally singing themselves into the minds and eventually the lives of the people.

The village theatre as a vehicle for education could be most effective if the actors are raised in the village itself. Happily, the histrionic art comes naturally to us, Indians, whether we are urban or rural. In every group of say, 20 villages, anywhere in this country, there is enough talent for any play which we wish to stage for their

education. But we should get as able a man as possible to do the training. And there should be as much continuity as possible about this training so that the acting, singing and the music do improve all the time. The actors could be illiterate, but still education is there. The audience of the night and those many more who are not there but who will be singing the songs of that play for years, none of these need be literate.

Co-operative Society. Although this is of very recent introduction into the village, the principles on which it is based are not new to India. That the working of a co-operative credit Society is in itself a very rich means of education, need not be doubted by any one.

(a) The co-operative society often answers to an utterly desperate need of the villager and therefore when wisely handled, it becomes a powerfully-effective lever for his uplift along many lines.

(b) The co-operative society is a specific social organisation. It trains people in combined action, it disciplines them in following the leaders chosen by themselves, and it chastens the leaders in having their policies and actions guided in a democratic way, thus furnishing a model for corporate activity along many lines and drawing out workers from the community and training them as it gathers strength. There are indeed other direct values, ethical and economic, which need no recounting here. To any one who is willing to take advantage of a co-operative society as a means of adult education, it is full of wonderful possibilities.

Enough has been said to show that the means for adult education are already existent in the rural areas themselves. Extension lectures, university settlements, community centres and such like are not necessary excepting for training workers and for administrative convenience. For the education itself, it is far better to utilise existing institutions and opportunities, with a curriculum which is as comprehensive as are the actual practical needs of the villagers.

SOME ASPECTS OF RURAL RECONSTRUCTION

BY Miss B. M. TWEDDLE,

Methodist Mission Village Industry, Tiruvallur.

The subject in which I am interested is village industries, and my contribution to this conference will be to give you a brief survey of the work we are doing in Ikkadu, a small village in the Chingleput district, thirty miles from the city of Madras, and in the light of this experience see how it can be applied in other places.

To you who know India so well it is hardly necessary to dwell on the appalling poverty of the majority of the village people. It is one of the most urgent problems with which India is faced today. It was

in an endeavour to ameliorate these conditions in the surrounding villages that industrial work consisting of weaving, lacquer work, embroidery, lace, machine work etc., was started.

To-day much is written of "Rural uplift" and the development of village industries, but the urgency was realised, and the work organised in Ikkadu many years ago, and now we are well established. Our aim was first to establish our head quarters in Ikkadu for teaching and training in weaving and other subjects, and afterwards to open smaller branch institutions to serve a chain of villages too far away to be in daily contact with the head quarters in Ikkadu, and to organise cottage industries in the surrounding villages.

A start was made in a mud and thatch hut with very little capital as Mission funds were not available for this purpose. A further expenditure was necessary for looms, yarn etc., all this meant considerable organising, and financial anxiety, but in spite of unspeakable and at times almost insurmountable difficulties the work expanded. Workers crowded in and the time soon arrived when the limited and unsuitable accommodation was seriously handicapping the development of the industry and suitable and adequate buildings were erected. The new building is square, all the weaving sheds are built round a central garden and the workers now number over two hundred. Christians and non-Christians of all castes and creeds are working together under healthy and pleasant conditions and are under medical supervision. If only that could be said of all hand looms in India, one is struck by the difference between our weavers and the ordinary village weaver. There is no more depressing sight than to see the emaciated form of a village weaver standing in the pit of his loom working in a small room with a window about 18' square. A tiny lamp hangs over the loom as they often work far into the night and start the same monotonous grind early the next morning.

Our Aims. The aims we have in view are the following :

1. Training boys to become weavers as full time workers.
2. To train agricultural workers for part time weaving and afterwards to hire simple looms to them so that the workers can weave at home and put to good use the many days during the year when they are unable to work on the land. These workers receive yarn from our head quarters and return the finished cloth for which payment is made without delay.
3. To train women and girls in embroidery, lace, etc. After a time our goods found a ready market and the work expanded and to-day "Ikkadu goods" are known throughout India. Those who do not work at home, come in daily from the surrounding villages. There are sixty-four women workers residing in the women's hostel

attached to the institute. These women come for training from all over the presidency. There is a small hostel for men where there are at present eighteen in residence.

The women do the winding for the weaving, and embroidery, lace, machine work, etc., and the men the weaving. *The latter earn on an average Rs. 20 per month.* Today there are boys doing attractive and difficult designs, who knew nothing about weaving two years ago. Every month close on Rs. 3000 is paid to the workers and Rs. 500 to the staff. This money is all raised from sale of goods; we have no other source of income apart from a very small grant from the Department of Industries.

Markets. As you know the success of an enterprise like this depends largely on the market. *A market does exist for the right articles.* Much yet has to be done in organising and in the developing of markets in connection with village industries, and much can be learned from Japan and China and the survival of small industries in Japan would repay careful study. When visiting wholesale houses in London I found that China and Japan are in much closer touch than India. We must not be afraid of producing goods for export; many countries thrive on exports and there are hand-woven fabrics being sold in London to-day at fabulous prices which could be made in India on a much cheaper scale. That means that hand-woven fabrics from India would find a ready market in London and other places if the organisation existed.

Organisation needed. Why cannot, what has been done in Ikkadu in a small way, be repeated in other places in South India? It is important to keep the people contented in the village instead of crowding into the cities and this is the only way. There is on the one side a vast army of idle people with natural skill of craftsmanship and there are so few ready and willing to organise this vast store of labour. Why aren't there more people ready to study village problems and help to alleviate the distress? Village Industries on Ikkadu lines in important places throughout the Presidency would be a great help to village people.

THE SILK INDUSTRY AND RURAL PROSPERITY IN KOLLEGAL TALUK

BY S. KRISHNAMURTHY, B. Sc. Ag.,

Farm Manager, Central Farm, Coimbatore.

Sericulture as a Home Industry. In a programme of rural reconstruction, the problem of a suitable home industry finds a prominent place. Many of the cottage and village industries in India, have declined, having succumbed mainly to large scale industrial organisations. But sericulture, as a cottage industry, has right through

withstood the competition of any such organisation. It is because, it has always been a poor man's industry, allied to the main profession of agriculture. It is, in fact, best followed with success where wages are low, holdings small and the agriculturist has enough time between one crop and another. Sericulture, as a home industry wherever it can be taken up, has few equals. It has all the advantages of hand spinning of cotton but is less exacting and more profitable. This industry, has therefore, come as a boon to Kollegal, where dry cultivation is the rule, the ryot is poor and has time to spare between crops.

It is my intention in this paper to emphasise the very important part which sericulture has played in the rural economy and prosperity of Kollegal taluk of Coimbatore district. This taluk is unique in being the only centre in the whole presidency, where the industry forms the main subsidiary occupation of the people. It is carried on under purely cottage conditions by all agricultural classes, in almost all the villages.

Suitability of Kollegal for Sericulture. Kollegal is a part of the Mysore plateau, 2000 to 2500 feet above sea-level, is sub-tropical in climate and is admirably suited to the rearing of silk-worms and the production of silk. The suitable temperature, for the industry, is said to be between 75° and 80° F, and humidity between 50 and 70 per cent. These conditions are mostly satisfied by Kollegal and Mysore. In fact, Kollegal owes its industry to Mysore where it was established in the days of Hyder Ali and Tippoo Sultan. Since those days, the industry has been so intermingled with the agricultural economy of this taluk that every phase of the industry has told on the prosperity of the people.

Importance of Kollegal as a Silk producing Centre. Though only a taluk in Madras province, Kollegal ranks among the principal silk producing centres of India. The Coimbatore District gazetteer (1933) states that in previous years, Kollegal's silk exports ranged from 50 to 60 lakhs of rupees. Kollegal was the chief centre of supply of raw silk for this presidency till the imports of silk from China and Japan and of artificial silk became a menace. The importance of this industry will be better understood, when it is stated that, according to the Tariff Board report, the number of persons depending on silk-worm rearing in Madras, was 1,20,000 in 1931—32. Surely an industry that supports this number, is important for the whole province.

The Branches of the Industry. To understand the economic significance of this industry, it is essential to deal in a brief manner with the branches of the industry, so as to bring out the economic aspect of each branch, as it affects the rural population.

Kollegal, along with Mysore, has a distinct race of silk-worms. These worms are multivoltine, fed on mulberry leaf and produce

greenish cocoons, yielding a beautiful lustrous silk of excellent quality. The industry divides itself into three branches, viz. (1) The cultivation of mulberry with the purpose of obtaining the leaves for the silk-worms, (2) The rearing of the silk-worms from the egg-stage to the cocoons and (3) Reeling of silk-thread from the cocoons.

Cultivation of Mulberry: The mulberry garden is the principal capital investment of a silk-worm rearer. His other requirements are few. It can be said in general, that mulberry occupies one-tenth of the total area in the taluk. A silk-worm rearer, generally, has his own mulberry garden. The cultivation of mulberry commends itself to the ryot for important reasons. Once planted, a mulberry plantation is kept on for 8 to 10 years. Cultivation is easy and not expensive. For his intercultivation, the Kollegal ryot is used to his indigenous, labour-saving, bullock-drawn implements called *guntas* in Kanarese. On careful investigation, I have found that it costs about Rs. 28 per year to cultivate an acre of mulberry. In years of insufficient rainfall a well established mulberry garden withstands drought better than other crops. In such years, rearing silk-worms has saved the ryots from the consequent acute general distress. In spite of the present poor price of silk, there has been no inducement to the cultivator to substitute entirely the food crops for the mulberry because in these years of trade depression, the fall in prices of food crops has been greater than that of raw silk, though serious the latter has been. Mulberry is thus a money crop to the Kollegal ryot. It provides him, in the form of cocoons, cash for his cultivation expenses and his necessities of life. For his food, the ryot generally grows his own food crops. It is estimated that an acre of mulberry produces about 4000 lb. of leaf per year, enough to produce about 300 lb. of cocoons or say 12 *maunds* worth nearly Rs. 100 at the present prices.

Silk Worm Rearing. According to the census report of 1931, there are at least 5000 families engaged in rearing of silk-worms. This works out to nearly one-third of the population of the taluk. The rearing of worms is carried on side by side with the cultivation of mulberry. While the farmer looks after the cultivation of mulberry, the rearing is looked after by the women and children of his family at home, who furnish all the labour required. The rearing room is a part of the house. It is this fact that makes Sericulture a perfect home industry. In this connection, the following passage, occurring in the Census Report of 1931, about the Silk industry in Kollegal is interesting:— "Women folk play a considerable part in the rearing of silk-worms and the care and vigilance that they bestow upon the rearing of worms are largely responsible for the considerable progress that has been made in the industry." In that report, it is estimated that for every 1000 men, 2108 women are engaged in silk-worm rearing. The women in this taluk are thus an economic asset.

Thus, this industry, by making use of the family labour which would otherwise go to waste and by also employing the spare time of the agriculturist, turns the waste into wealth. This is a gain, not only material, but also moral. The initial equipment necessary for an average grower costs about Rs. 12.

The care with which the worms have to be looked after, from the hatching of eggs to the spinning of cocoons,—especially with regard to feeding with the right quality and quantity of leaves, at proper frequency, according to age and with regard to stopping and resuming feed at the proper time before and after moulting,—cultivates a certain alertness of mind and a spirit of co-operation in the family, without which the rearing will not be successful.

The scrupulous cleanliness with which the worms have to be handled and the need for cleanliness in the surroundings (without which, the worms cannot thrive), promotes a sanitary sense in the village. The silk-worm litter is carefully collected and fed to cattle and is very much relished by them. It is rarely thrown away in the manure pit.

Seed Production. In Kollegal, as in all other places, where Sericulture is established, the production of seed cocoons is a separate branch of the industry and this gives employment not only to those who produce the seed but also to the vendors who buy from them and sell to the rearers.

There is another branch of this seed-production, which has a scope for employment of trained men in the rural areas to the great benefit of the rearers. I allude to the production of disease-free seed. The silk-worms are particularly prone to diseases, especially Pebrine, which is hereditary and contagious. This disease once threatened the extinction of the industry in Europe, especially in France, which was saved, by the timely researches of that great scientist, Pasteur. It is, by his method of elimination of every diseased laying, whose female moth by microscopic examination shows the existence of pebrine, that the disease-free seed is produced. But for the control of this disease, the industry might not have been what it is to-day. It has thus to be understood that the production of disease-free seed is most important in sericultural development. The Government have therefore concentrated their efforts in this direction. They have established farms at Kollegal, Hosur and Palmaner for producing disease-free seed. They have also stationed a party called the Peripatetic Rearing party at Kollegal who distribute this disease-free seed, buy cocoons themselves from reputed vendors, prepare and distribute disease-free layings, and also induce the ryots to get their seed, tested for disease. The demand for disease-free seed is being increasingly met every year by the sericultural section of the Department of Industries. Thus, while, in the year 1931–32, the proportion of disease-free seed

supplied, to the total requirement, was only about 10%, it can now be said that it is more than 40%. There is nearly 60% still to be supplied, which offers a scope for private enterprise. This in fact, is encouraged by the Government, who give financial aid to private grainages. According to the available statistics, 1,260,000 lb. of cocoons worth Rs. 4,20,000 were produced in 1931—32.

(iii) *Reeling*. This is a separate and important branch of the industry. These cocoons, as differentiated from those of Eri silk-worms, consist of a continuous thread of silk-fibre. Reeling consists in unwinding these continuous threads from a sufficient number of cocoons at a time and joining them together to give a combined thread of desired thickness. This is done by a hand-driven *charka*, which reels the thread from the cocoons placed in a basin of hot water. In 1931-32 the number of such country reeling machines in Kollegal, was 500, giving employment to about 2000 people. Besides the professional reeler who reels the silk thread from the cocoons, women are employed to turn the reel and men to supply water and fuel to the basins. From the statistics available, it is learnt that 90,000 lb. of reeled silk worth Rs. 4,50,000, were produced in 1931—32.

Besides the raw silk that is produced, the reeler gets the silk-waste as a by-product which has till now been exported to foreign countries for being converted into spun silk. But with the establishment of a spinning plant in Mysore, silk-waste will have an easily accessible market. The statistics show that there was 45,000 lb. of silk waste in 1931-32 worth Rs. 8,000.

Weaving. The last branch of the industry is the hand-loom weaving which is also a cottage industry. The handloom weaver, not only in this taluk, but also in the other principal weaving centres in the presidency, was dependent on the raw silk, mainly of Kollegal, till the cheap foreign silk and artificial silk lured him. The seriousness of the competition from China and Japan will be known from the following, obtained from the Census report of 1931:—

The imports of raw silk in the presidency in

1915—16 was 5.62,18 lb.

1929—30 „ 8, 25,930 lb.

valued at over 47 lakhs of rupees. Whereas, from the same report, it is learnt that in 1911, out of the 8,00,000 lb. of raw silk consumed in the province, 360,000 lb. was from Kollegal, 3,00,000 from Mysore and only the rest from Bengal and China. As the handloom weaver is the main consumer of raw silk, on him depends to-day the scope of expansion of the industry.

Marketing. Silk is generally marketed through a chain of merchants or commission agents. There is no sorting or grading. The

marketing of silk is thus backward. With higher efficiency in marketing which is bound to come, as a result of establishment of a central marketing organisation, this industry should also benefit.

The decline of this industry, due to foreign competition, was brought to the notice of the Government who instituted an enquiry by the Tariff Board in 1932, which has been helpful to the industry and protection for the present has been given. If such an important and interesting industry should, for any reason, disappear, we shall be losing an industry on which depends the livelihood and prosperity of a large rural population.

To Sum up. (1) Sericulture is a perfect home industry. (2) It occupies an important place in the rural economy of the taluk. But for this industry, the poor ryot of Kollegal, would have been frequently faced with starvation. (3) For the cash, which the agriculturist requires, for his necessities and his expenses between one harvest and another sericulture helps him. At any rate, it gives him credit-worthiness. (4) Apart from the material advantages, the industry induces mental alertness and co-operation. A sericultural village, especially previous to the trade depression had a characteristic atmosphere of life and prosperity and even to-day looks more resistant than an ordinary village, to the havocs of trade depression, irregular rains and unemployment among labouring classes.

The Industry in General. With reference, in general, to the industry in India, there is a great possibility of expansion. It is estimated that India consumes about double the quantity of raw silk which she produces. With better methods of cultivation of mulberry, of rearing of worms, reeling, marketing and a better organisation of handloom weaving there is no difficulty for expansion, as India has all the natural advantages for the industry. In fact, the expansion of silk Industry, in places wherever possible, will open up fresh avenues of employment for the rural population.

Acknowledgment. I take this opportunity to thank Mr. K. T. Achiah, the Sericultural Expert and Mr. Ramachandra Rao, the Silk Superintendent, who kindly afforded me facilities for studying the industry, while I was in Kollegal.

Research Notes.

The White top shoot borer of sugarcane (*Scirpophaga*)

Mention has been made in the previous publications on the top shoot borer of cane about the presence of two species of *Scirpophaga* in South India, at any rate, in the Madras Presidency. These are *S. monostigma* and *S. auriflua* (*S. xanthogastrella*, *S. intacta*, *S. nivella*) the former with a black spot on each of the forewings and the latter without spots. In our recent studies of the pest it was found difficult to distinguish the larval and pupal stages of the two moths and this led us to suspect that there may be only one species after all. The

caterpillars hatching out of the eggs laid by the two moths were therefore reared separately in pot plants inside wire gauze cages. It was found that both the spotted and spotless forms were got from the progeny of either. It was also observed that there were gradations even in the size of the black spots. Some moths had prominent spots with about 100-150 black scales while others had very few such scales. So it looks as if there is only one species of *Scirpophaga*. Detailed studies including the examination of the genitalia of moths and rearings of larger number of caterpillars are in progress to confirm the results already obtained.

Agri. Research Institute, }
 Coimbatore, }
 Dated the 10th August '37. }

M. C. Cherian,

C. K. Subramaniam.

EXTRACTS

Jelly Making. One of the most important things in making jelly is to get the fruit at the right stage. Half-ripe fruit is necessary to make good jelly. The proportion of sugar is generally 1 cup to 1 cup of liquid. Boil juice for 10 to 15 minutes. Add sugar and boil quickly from 10 to 20 minutes when it should be tested by putting a little on saucer. Any strong material with a close weave answers almost as well. Before straining jelly, the bag should be wrung out with clean, hot water. The last of the liquid should be allowed to drip slowly through the bag unaided by pressure. To strain small quantities of jelly, reverse a chair and place the seat flat on the table, tie cloth to the four legs, and place bowl under cloth.

Recipes. **Apple Jelly.**—Take as many apples as required, windfalls will do, and small ones are the best. Place in a preserving pan with enough water to cover them; when boiled to a pulp, do not stir, strain through a jelly bag, and to every breakfast cup of juice add three-quarters cup of sugar. Boil briskly until it jellies, and pour into jars. Exclude air from jars either by covering with paraffin wax or paper moistened by being applied to jar.

Lemon jelly.—4lbs. of lemons cut in slices in 4 quarts of water. Let stand all night. Boil for half an hour. Stand until next day, strain through flannel. A cup of sugar to cup of juice. Boil from 20 to 30 minutes.

Quince Jelly. 6lbs. quinces, 5 pints of water, sugar. Wash fruit and cut in small pieces. Put in pan with water and stew slowly, mashing from time to time until fruit becomes tender. Strain through jelly cloth. Boil liquid 20 minutes. Add equal amount of sugar. Boil briskly for 10 minutes. (*Journal of the Dept. of Agri. S. Australia—May 1937.*)

Hybrid Vigour in Plants. Increased vigour over either parent of the product of the cross between two inbred lines has been frequently reported in plant breeding and, through vegetative propagation, efforts have been made, especially with trees, to make practical use of the phenomenon. It is usually explained, in Mendelian terminology, as the result of association of several genes for size which had been isolated in either parent, and subsequent loss of vigour in succeeding generations is attributed to segregation. There has been little analysis, however, of the factors contributing to the heterosis or hybrid vigour during the development of the hybrid, so that considerable interest is attached to recent series of papers by Dr. Eric Ashby which have brought to light some most unexpected features of this process in specific cases.

In certain strains of maize and in two cases with tomato strains where the hybrid showed greater weight and dry weight, greater height, more leaves and larger leaf area than either parent, analysis of these differences showed no appreciable difference between hybrid and parent in relative rates of growth or

of dry weight increase, of rates of production of leaves and new leaf area or of photosynthetic efficiency. Cell size in hybrid and parent also seemed approximately the same, but the embryo of the resting seed seemed larger in all cases.

The only possible conclusion from these results would seem to be that the organization of the growing shoot of the hybrid is upon a larger scale. Embryo and shoot apex form cells more rapidly, but this does not result in a quicker release of leaf primordia from the shoot apex because the whole plan of shoot organization, though still that characteristic of the species, is built upon a larger scale. More cells must accumulate at the apex before the new leaf primordium must separate. Naturally, therefore, when it arises, this primordium is planned on a larger scale from the outset, presumably its procambial and vascular strands are commensurately larger and it grows into a larger leaf, though individual cells in their metabolic and photosynthetic efficiency, correspond with those of the parent forms.

Dr. Ashby speaks of larger primordia in the seed but the term is usually applied to leaf primordia, and in the embryo of the tomato, apart from cotyledons, leaf primordia will scarcely be manifest yet. It would seem that the comparison is rather upon the scale of organization of the meristematic aggregate in the hybrid shoot; planned on a more generous scale, it yet maintains the rate of leaf development of the parent, so that its growth must mean a larger number of meristematic cells maintained in full activity at any moment, therefore more cell divisions and the growth organization of the species maintained at its usual *tempo* but on a larger scale.

Dr. Ashby's studies are therefore full of significance in relation to the problem of shoot organization in the higher plant, as well as in connexion with the genetic explanation of hybrid vigour. Dr. Ashby points out that his results are not in accordance with the usual interpretation given to the linkage of genes in the F_1 generation, but there is as yet so little information as to the way in which the gene is geared into the machinery of development that it is early to say whether the conventional explanation in terms of genes can be applied to the machinery now revealed as operating in the development of the hybrid. (*Nature*—May 15, 1937.)

Agricultural Fottings.

(The Department of Agriculture, Madras).

Why a Pest Act is necessary for Cambodia Cotton. Cambodia, karunganni and uppam cottons were sown side by side on the Cotton Breeding Station during the year for certain experimental studies. They were picked separately every week. When their weekly pickings were sorted into good and insect damaged kapas, it was found that Cambodia kapas contained 50% more of damaged sort than karunganni and uppam. These have indicated that though karunganni, uppam and Cambodia are sown together, it is the Cambodia variety that suffers most from pests and that the enforcement of the cotton pest act is especially necessary for this variety.

The place of money-crops in the Tanjore Delta. Over a million acres of land are devoted to cultivation of paddy annually in Tanjore District without rotating it with any other crop. Of this area, about $1\frac{1}{2}$ to 2 lakhs of acres are cropped with paddy twice a year while the rest of the area is devoted to a single crop. When prices were ruling high at Rs. 2—8—0 to Rs. 3—0—0 per kalam of 64 lb. there was a decent margin of profit kept for the mirasaders even from a low average yield of 30 kalams per acre. But with the fall in price of paddy ranging from 40 to 60 per cent from 1930 onwards the margin of profit has become very narrow.

Therefore, the immediate problem for the mirasdars was to find out whether there was any possibility of introducing with success other and more profitable crops in wetlands of Tanjore District. Assisted by the departmental crops like sugarcane, plantains and Cambodia cotton were grown.

Sugarcane. The trials conducted with sugarcane of various varieties have definitely established the fact that it is quite possible to grow fairly good crops in paddy fields. Medium soils with fairly adequate irrigation and drainage facilities are preferred. The yields per acre ranged from 25 to 40 tons and it is reckoned that an average of 30 tons per acre could be easily realised under proper cultivation and management. Canes have been introduced in all the taluks of the District. It is also gratifying to record that the mirasdars who were new to this crop, straightaway adopted along with the new cane introduced, up-to-date methods of cultivation such as trench planting etc. This is indeed a distinct gain. Co. 281 and 285 medium canes of the Imperial Cane breeding station, Coimbatore have been found to do very well under ryots' conditions. These varieties have the reputation of withstanding adverse seasonal conditions to a greater extent than the thick canes. They are of short duration, requiring less cultivation expenses capable of withstanding drought and water logged conditions. Good jaggery has been obtained in 8 to 9 months amounting on an average to 6,000 lb. per acre. Further, these varieties are prepared by factories and they readily find favour with Nellikkuppam Factory for sugar manufacture and they are being purchased for this purpose in Shiyali Taluk and its vicinity.

Plantains. Generally plantain in Tanjore District is confined to 'padugai' lands adjoining river banks and it is seldom grown in paddy fields. The introduction and trial crops grown in the paddy lands for the last few years has shown that under proper cultivation fairly good crops can be obtained in paddy fields for three years in the same field. But due to prevalence of cyclonic weather almost every year during north-east monsoon period when bunches appear, the plants have to be propped. It is quite possible to grow plantains in paddy fields of Tanjore as is done in the neighbouring district of Trichinopoly. The cultivation of Mauritius plantains obviates the costly item of propping.

Cambodia Cotton. Trials to grow Cambodia Cotton in between two crops have proved to be of considerable promise. Favourable results have been obtained with the trials conducted in the Agricultural Research Station, Aduturai. Based on this experience, District trials have been laid out in the last season. The results are awaited.

Pineapple—the prospect of the modan lands. The dry lands of the West Coast known as the 'modan' lands in South Malabar are considered to be extremely poor in productivity, and the 'Jenmi' or land-owner gets as rent from this kind of land only 'Vithu-pattam' or just enough paddy equal to the seed used for the area. But a very remunerative crop like pineapple can be successfully grown in modan lands. The profitability of the crop has given a fillip to the cultivation of this valuable fruit on a plantation scale and the area is steadily on the increase. A net profit of Rs 910 per acre was realised at the Agricultural Research Station, Pattambi during a period of 5 years (the total cost of cultivation for the 5 years including manuring was Rs. 596 and the total receipt was Rs. 1,507). The pineapple cultivation at this station has commenced functioning as a source of supply of fruits, and planting material to the intending cultivators, and shall continue to do so in a larger measure in future.

Pineapple can be grown in all kinds of soils provided there is very good drainage; the laterite soils afford enough aeration and drainage and are found to be the best suited. Propagation is generally from suckers which are of different origin. The 'Ratoons' which spring from below the soil and the suckers arising in the axils of the leaves are to be preferred. Planting is generally started with

the onset of the south west monsoon rains in June—July. It is also done in north—east monsoon periods in September—October, the only point to be borne in mind being the presence of adequate moisture in the soils for the plants to establish. The most popular varieties are the 'Kew' and the 'Mauritius'. Trench planting is the ideal and 10,000 to 12,000 suckers can be planted in an acre. No manure is too rich and an average crop is said to remove 60 lb. of Nitrogen, 212 lb. of Potash and 17 lb. of Phosphate per acre. Enough quantity of manure in the form of cattle manure, wood ash and artificials like Super, Nicifos or Ammonium sulphate to replenish the above quantity would be responded to. Once the crop is established it requires very little attention excepting incorporation of manure, and clean cultivation. The harvest of the crop largely depends on the kind of planting material used, its age, season of planting, soil and the fertilisers used. Suckers and ratoons of optimum size (about 6 months old on the mother plant) would produce fruits from the 15th month onwards after planting. There are two main periods of harvest April to July and October to January, though stray fruits may be available at other times also. The average weight of the 'Kew' fruit is found to be from 5 to 8 lb., the highest weight recorded at the Agricultural Station, being 18 lb. Great care has to be taken in handling the fruit as even slight abrasions are bound to damage the fruit. A plantation once started can be kept going for 5 to 6 years or even more. The plant is thoroughly adapted to xerophytic conditions and is purely rainfed on the West Coast. Organised efforts in marketing will find a ready sale for the fruits.

"The Coconut Caterpillar." *Introduction.* The coconut caterpillar (*Nephantis serinopa*) is one of the major pests of the Coconut palms on the West Coast. The insect has been noticed doing severe damage to coconut fronds during the summer months—February—March to April—May in the taluks of Kurumbranad, Calicut, Ernad and Ponnani in Malabar District and in Mangalore, Ullal and Kasargod in South Kanara District. The pest is not likely to increase in numbers during the monsoon months due to the beneficial activity of the *Eulophid* pupal parasite and also the heavy monsoon showers. The coconut garden owners are, however, warned against the outbreak of the pest during the coming summer months.

Life History of the pest. A short account of the life history and habits of the pest is given below for the use of the garden owners. The pest is a caterpillar about $1\frac{1}{2}$ " long striped with pale purple. It feeds on the green matter of the lower surface of the leaves sheltering itself in long galleries constructed out of bits of chewed leaf and pellets of excreta bound together with strands of silk. In severe cases of infestation the leaflets may be reduced to a dry papery tissue. When the caterpillar becomes fullfed it prepares an oval chamber of silk and excreta among the galleries, and turns into a seed like object known as 'pupa'. In about ten days the pupal skin bursts and the moth comes out. The moths are able to fly from tree to tree and garden to garden. They lay eggs about 200 to 300 in number, on the leaves and tiny caterpillars hatch out of the eggs in 4 or 5 days. These feed on the leaves and gradually increase in size. It takes about $1\frac{1}{2}$ to 2 months for each insect to develop from egg to moth.

Methods of control. Coconut palms are too tall to deal with the pest by spraying with insecticides. The only practical method is to cut down infested fronds in a locality at one time and to destroy the caterpillars found thereon by burning the leaves. Since each caterpillar left undestroyed would mean an increase two hundred fold in the next generation the importance of a thorough cleaning is apparent.

An attempt will also be made by the Agricultural Department to breed parasites which attack the pest in different stages with a view to liberate them in affected gardens.

Correspondence.

To The Editor, Madras Agricultural Journal.

Sir,

Mr. S. Gopalakrishnan of Theyagarayanagar in an article about Bee Keeping in the "Gardener," published by Pestonjee P. Pocha and Sons, Volume No. 1st and 3rd, page 33 states about the birth of a queen that when a queen is needed a worker egg or larvae not more than three days old is transferred to an acron shaped cell, specially built for rearing of queen and the chosen larvae is given special feeding with a rich food usually termed "Royal Jelly."

It is an accepted fact that the reigning queen lays an egg in each queen cell specially constructed when a new queen is to be produced, by many authors including Mr. S. Ramachandran of the Department of Agriculture.

Can any one throw light whether the assumption of S. Gopalakrishnan is also correct in the light of his experiences, since it is commonly recognised that laying of eggs by the queen in queen cells for future production of queens is a common occurrence.

4th August 1937.

K. M. V.

Reply.

Sir,

The statement made by Mr. Gopalakrishnan in his article on 'Beekeeping' under the heading "The Birth of a New Queen" cannot be accepted as a general rule. The transferring of the eggs or grubs happens only in exceptional cases, where the colony has lost its reigning queen all on a sudden. Under such circumstances, the workers construct queen cells generally round a fertilised egg or a newly hatched grub in the centre of the brood comb itself and rear a queen there. Occasionally, queen cells are also constructed along the lower border of the brood comb and in such cases the transferring of the egg or the grub becomes an obvious necessity.

The general rule is that a queen is reared only from a fertilised egg laid in the queen cell by the reigning queen. Mr. Gopalakrishnan should have stated this first and then made the other statement, if necessary.

Coimbatore, }
17--8--1937. }

(Sd.) M. C. Cherian,
Government Entomologist.

Crop & Trade Reports.

Cotton Raw, in the Madras Presidency. The receipts of loose cotton at presses and spinning mills in the Madras Presidency from 1st February 1937 to 20th August 1937 amounted to 407,215 bales of 400 lb. lint as against an estimate of 533,100 bales of the total crop of 1936-37. The receipts in the corresponding period of the previous year were 468,295 bales. 289,072 bales mainly of pressed cotton were received at spinning mills and 178,022 bales were exported by sea while 79890 bales were imported by sea mainly from Karachi and Bombay.

(Director of Agriculture).

1937-38--First forecast Report. The average of the areas under cotton in the Madras Presidency during the five years ending 1935-36 has represented 9.5 per cent of the total area under cotton in India.

The area under cotton up to the 25th July 1937 is estimated at 227,000 acres. When compared with the area of 286,300 acres estimated for the corresponding period of last year, it reveals a decrease of 20·7 per cent.

Central Districts and South—Mainly Cambodia tract. The area in the Central districts and the South represents generally the last year's crop left on the ground for second pickings before the plants are removed in September in compliance with the provisions of the Pest Act. The area in these districts fell from 161,200 acres to 161,000 acres. The yield is expected to be generally fair.

Northerns and Westerns tract. The area under Northerns and Westerns fell from 103,000 acres to 46,600 acres, i. e., by 54·8 per cent. owing mainly to the want of timely and sufficient rains.

Cocanadas tract. The area under Cocanadas cotton fell from 15,100 acres to 13,200 acres, i. e., by 12·6 per cent. The decrease in Guntur alone is estimated at 1,000 acres and this is largely due to an increase in the cultivation of groundnut in preference to cotton.

The wholesale price of cotton lint per imperial maund of 82½ lbs. as reported from important markets on 2nd August 1937 was about Rs. 20—9—0 for Cocanadas, Rs. 21—6—0 for red Northerns, Rs. 19—0—0 for white Northerns, Rs. 18—12—0 for westerns (mungari crop), Rs. 21—7—0 for westerns (jawari crop), Rs. 27—5—0 for Cambodia, Rs. 27—8—0 for Coimbatore Karunganni, Rs. 21—11—0 for Tinnevellies and Rs. 22—5—0 for Nadam cotton.—(*Director of Industries*).

Sugarcane—1937—38—First report. The average of the areas under sugarcane in the Madras Presidency during the five years ending 1935—36 has represented 3·4 per cent of the total area under sugarcane in India.

The area under sugarcane up to the 25th July 1937 is estimated at 61,620 acres. When compared with the area of 96,950 acres estimated for the corresponding period of last year, it reveals a decrease of 17·5 per cent. The decrease in area is general except in Anantapur, Malabar and South Kanara. The area is estimated to be the same as in the previous year in Anantapur and to have increased slightly in Malabar and South Kanara. The decrease in area elsewhere is generally attributed to the low price of jaggery which prevailed at the time of planting of cane.

The condition of the crop is generally satisfactory.

The wholesale price of jaggery per imperial maund or 82½ lb. as reported from important markets on 2nd August 1937 was Rs. 5—8—0 in Adoni, Rs. 4—12—0 in Mangalore, Rs. 4—11—0 in Erode, Rs. 4—6—0 in Trichinopoly, Rs. 4—2—0 in Salem and Coimbatore, Rs. 3—12—0 in Cuddalore, Rs. 3—10—0 in Rajahmundry, Rs. 3—5—0 in Vellore, Rs. 2—15—0 in Cocanada, Rs. 2—12—0 in Vizianagaram, Rs. 2—7—0 in Bellary and Rs. 2—6—0 in Vizagapatam. As compared with the prices reported in the corresponding forecast of last year, these prices reveal a fall of 41 per cent in Bellary, 25 per cent in Vizagapatam and Cocanada, 16 per cent in Rajahmundry and Adoni and 9 per cent in Vellore and a rise of 49 per cent in Trichinopoly, 16 per cent in Salem and 7 per cent in Mangalore, the price remaining stationary in Coimbatore.—(*Director of Industries*).

Groundnut—1937—Second Report. *Summer Crop—Area and Yield.* The area under the summer or irrigated crop of groundnut in parts of the Madras Presidency during the five months January to May 1937 is estimated at 67,800 acres. When compared with the area of 61,300 acres estimated for the corresponding period of last year, it reveals an increase of 10·6 per cent. The crop has been harvested in most places. The yield is expected to be normal in all districts

except in Cuddapah and Trichinopoly where it is expected to be below normal on account of insect attack in the former district and to insufficient water supply in the latter. The total yield is estimated at 60,100 tons of unshelled nuts as against 54,900 tons estimated for the corresponding period of last year.

Early Crop—Area and Yield. The area under the early crop of groundnut (mostly unirrigated) up to 25th July 1937 in the districts of Salem and Coimbatore is estimated at 181,000 acres. When compared with the area of 128,000 acres estimated for the corresponding period of last year, it reveals an increase of about 41·4 per cent. The condition of the crop is satisfactory. The total yield is estimated at 90,500 tons of unshelled nuts as against 64,000 tons estimated for the corresponding period of last year.

The wholesale price of groundnut shelled per imperial maund of 82½ lbs. as reported from important markets on 2nd August 1937 was Rs. 6—2—0 in Vizagapatam, Rs. 6 in Cuddalore, Rs. 5—14—0 in Vizianagaram, Rs. 5—13—0 in Guntur, Rs. 5—2—0 in Vellore and Erode, Rs. 4—15—0 in Cuddapah, Rs. 4—13—0 in Adoni and Rs. 4—12—0 in Bellary. As compared with the prices prevailing towards the close of June 1937 published in the last report, these prices reveal a fall of 6 per cent. in Cuddapah, 5 per cent. in Cuddalore, 3 per cent. in Bellary, 2 per cent. in Vizianagaram and Vellore and 1 per cent. in Adoni and a rise of 2 per cent. in Vizagapatam, the prices remaining stationary in Guntur and Erode.—(*Director of Industries*).

Gingelly—1937-38—First report. The average of the areas under gingelly in the Madras Presidency during the five years ending 1935-36 has represented 15·2 per cent. of the total area under gingelly in India.

Area. The area under gingelly up to 25th July 1937 is estimated at 356,800 acres. When compared with the area of 344,700 acres estimated for the corresponding period of last year, it reveals an increase of 3·5 per cent. There has been a large increase in area in the central districts and Madura which has been partly counterbalanced by a large decrease in area in the Circars, the Deccan and the districts of Chingleput and South Arcot.

Yield. The yield is expected to be below normal in Vizagapatam, Kistna, Nellore, South Arcot, Trichinopoly and Madura and normal in the other districts.

The wholesale price of gingelly per imperial maund of 82½ lbs. as reported from important markets on 9th August 1937 was Rs. 6—11—0 in Cuddalore, Rs. 6—7—0 in Ellore, Rs. 6—4—0 in Trichinopoly and Tinnevely, Rs. 6—3—0 in Tuticorin, Rs. 6—0—0 in Cocanada, Rs. 5—14—0 in Rajahmundry, Rs. 5—12—0 in Salem, Rs. 5—11—0 in Vizianagaram and Rs. 5—4—0 in Vizagapatam.—(*Director of Industries*).

THE MADRAS AGRICULTURAL STUDENTS' UNION

The annual general body meeting of the Union was held on Sunday the 25th July 1937 with Mr. R. C. Broadfoot, Principal and President of the Union in the chair. The minutes of the previous general body meeting, the annual report for the year 1936—1937 and the auditors' report were read and adopted. The budget estimates for the year 1937-38 were discussed and passed.

The following resolutions proposed by Mr. K. Unnikrishna Menon were passed :—

In view of the agricultural graduate being intimate with the actual life of the villager, the Madras Agricultural Students' Union recommends to Government that a proportion of the officers of the Revenue, Co-operative, Labour and Education Departments and Panchayat officers be recruited from among the Agricultural graduates.

As ruralisation of the system of education is an important means of reducing unemployment among the educated classes the attention of the Government be drawn to the desirability of expediting the provision of facilities for the starting of agriculture as an optional or vocational subject in such areas as offer facilities for such provision.

The question of assignment of lands to agricultural graduates and starting of colonies of unemployed graduates was next discussed and the following resolution was passed:—

The Madras Agricultural Students' Union recommends to Government that a special committee including representatives of the Madras Agricultural Students' Union be constituted to go into the question of colonisation of lands by agricultural graduates.

The following office bearers for the year 1937–1938, were elected:—

Council. *Moffusil Vice Presidents:* Mr. K. Unnikrishna Menon, Rao Bahadur G. Jogiraju Garu and Mr. V. T. Subbiah Mudaliar—*Moffusil Members:* Messrs K. Gopalakrishna Raju, A. Chinnathambi Pillai, K. T. Bhandari and A. Chidambaram Pillai and *Resident members:* Rao Bahadur S. Sundararama Ayyar, avl.; Rao Sahib T. V. Rajagopalacharyar avl.; Rao Sahib V. Muthuswami Ayyar avl. and Mr. K. V. Srinivasan (Student).

Managing committee. *Vice President:* Mr. V. Ramanatha Ayyar—*Editor:* Mr. M. U. Vellodi—*Secretary:* Mr. M. A. Sankara Ayyar—*Manager:* Mr. P. A. Venkateswara Ayyar—*Treasurer:* Mr. T. S. Lakshmanan—and *Members:* Messrs. C. S. Krishnaswami, C. Jaganatha Rao, C. Rajasekhara Mudaliar and S. K. Jogi (Student),

Editorial Board. Editor, Secretary, Manager, Dr J. S. Patel and Messrs M. C. Cherian, K. M. Thomas and R. Viswanathan (Student)—

Report of the Managing Committee for the year 1936–37.

(Presented to the General Body.)

The Managing Committee beg to present the following report of the activities of the Union for the year 1936–37.

Membership. The strength of the Union as it stood on 31st May 1937 was 450, including 97 student members. It is noted with regret that nearly two-fifths of the members of the Department are still not members of the Union. We appeal to all of them to join the Union and add to our strength. At the last General Body Meeting the Managing Committee was empowered to extend to such unemployed old boys of the College as require it, the concession rate of subscription applicable to students under the rules. This concession was availed off by eleven old boys.

The Managing Committee. Consequent on his transfer to Adoni, Mr. S. M. Kalyanarama Ayyar resigned his secretaryship in May 1937, and the Managing Committee elected Mr. M. A. Sankara Ayyar as Secretary in his place. Mr. T. S. Lakshmanan was elected as Treasurer and Mr. K. Ramaswami as a member of the Managing Committee. The Committee places on record its appreciation of the wholehearted services rendered by Mr. Kalyanaraman during the time he was Secretary.

Committee Meetings. There were 9 meetings of the Managing Committee during the year.

Journal. The Journal maintained the high standard associated with it. It continued to be printed at The Scholar Press, Palghat. We have great pleasure in recording our grateful thanks to The Editor and the members of the editorial board for the efficient conduct of the Journal. We have also to record our

appreciation of the promptness and regularity of the printers, The Scholar Press, Palghat.

During the year under review one of the members of the editorial board, Mr. K. Ramiah, left us to take up the appointment of Geneticist at Indore. He is one of the oldest members and an enthusiastic worker in the cause of the Union. We wish him all success in his new sphere of activities.

Subscribers. The number of subscribers (non-members) to the Journal during the year was 200. 25 Journals, Indian and foreign, were on the exchange list. We take this opportunity to appeal to all the members of the Union to actively and materially help the Union by enlisting more subscribers.

Grant of land and money to Agricultural Graduates. At the last General Body Meeting held on the 1st of August 1936, the following resolution was passed: "That this General Body Meeting requests the Director of Agriculture to move government about making statutory provision for the free grant of lands, wherever available and the necessary funds, to agricultural graduates, and that a Committee consisting of M. R. Ry. Rao Sahib V. Muthuswami Ayyar Avl., M. R. Ry. Rao Sahib T. V. Rajagopalachariar Avl., Messrs. G. Jogi Raju, K. Krishnamurthi Rao, G. Mahadevan and the Vice President and Secretary of the Union be formed to prepare an elaborate note as to how the objects could be achieved, for forwarding it with the resolutions to the Government."

The resident members of the sub-committee met and elected M. R. Ry. Rao Sahib Muthuswami Ayyar Avl. as the Convenor of the Committee. Materials for the note are being collected. The task is not an easy one, as a sound case with facts and figures has to be made out.

Finance. The Auditor's Reports and the financial statements are before you. Our finances have shown an improvement over last year inspite of the extra expenditure in connection with the Jubilee celebrations last July and a fairly large amount of arrears in subscription from our members. These dues could not be collected before the end of May owing to changes in the Managing Committee as well as in the permanent establishment. These collections are now in progress.

Ramasastrulu--Munagala Prize. The announcement regarding the Ramasastrulu-Munagala Endowment Prize was made in the April and May numbers of the Journal. We are sorry to note that there was no response and the prize has therefore not been awarded this year.

Establishment. Till towards the end of 1936 the Union was managing its office work with the help of a permanent and an occasional part-time clerk and a peon. A whole time clerk and a boy have now been appointed, thus securing economy and efficiency.

Acknowledgements. We take this opportunity to record our heart-felt thanks to Messrs. R. W. Littlewood and R. C. Broadfoot who as presidents took a keen interest in the affairs of the Union and rendered valuable help, especially in connection with the College Day celebrations. The Union owes a deep debt of gratitude to M. R. Ry. Rao Bahadur D. Ananda Rao Garu for his abiding interest in the activities of the Union. He has been intimately connected with it in the past as Vice-President and President. We learn with regret that he is shortly to retire from active service and we hope that we shall continue to have his help and guidance. We wish him a long, happy and prosperous life. We shall be failing in our duty if we do not record our grateful thanks to the members and convenors of the various committees who whole-heartedly helped us in celebrating the Jubilee last year, especially to Mr. & Mrs. Cherian who organised the tea to the visitors and to Mr. H. Shiva Rau who conducted the sports. Our thanks are also due to Mr. Davis, Principal of the Forest College for loaning to us furniture and tents.

College Day Sports.

The athletic sports in connection with the 26th College Day were held under the auspices of the Madras Agricultural Students' Union on Saturday the 24th July 1937. The College maidan was decked as usual with flags, streamers and buntings. The weather was very favourable till the day previous to the sports but the morning dawned with a clouded sky, and there was slight precipitation too; but fortunately the rain ceased after wetting the ground and imparting to it just that softness which competitors greatly like.

The sports commenced punctually at 3 p. m. and all the items on the programme were completed by 6-10 p. m. There was as usual the keenest competition for ranks and three new records were created, two by Mukundan, in Long Jump and Javelin throw and one by Monappa Hegde in Cricket ball throw.

Mukundan, by scoring 63 points, was again the champion for the third time in succession. This is the first time in the annals of the College Day sports that a student performs such a feat.

After the events were over Mr. R. C. Broadfoot, Principal and President of the Union, gave a short review of the sports, and requested Mrs. A. C. Woodhouse to distribute the awards. Mr. H. Shiva Rao, the President of the sports committee, proposed a hearty vote of thanks to Mrs. Woodhouse for so graciously accepting our invitation to give away the prizes.

As usual the Union was at home to the ladies and gentlemen who responded to our invitation to witness the sports. Our thanks are due to Mrs. K. M. Thomas for her help in arranging for the 'at home.'

The Union takes this opportunity to record their sincere thanks to Mr. H. Shiva Rao and the other members of the sports committee and all those who gave of their best to make this function a success.

List of Prize Winners.

Cross Country Race (The Norris Cup). 1. T. M. Marthapa Kini. 2. M. Zainulabedeem. 3. T. V. Sailavasadasu.

Hundred Yards Dash (The Saidapet Old Boys' Cup). 1. M. Mukundan. 2. S. V. Joseph Doss. 3. K. M. Aiyappa.

Long Jump. 1. M. Mukundan. 2. M. Ramiah. 3. K. M. Aiyappa.

Shot Put. 1. M. Mukundan. 2. P. K. S. Mani. 3. Mohan Punja.

High Jump (Rao Bahudur C. Tadulingam Cup). 1. M. Mukundan. 2. P. K. S. Mani. 3. M. Ramiah.

Quarter Mile Race (The Prince of Wales Cup). 1. T. M. Kini. 2. M. Mukundan. 3. N. J. Sreshta.

Cricket Ball Throw. 1. Monappa Hegde. 2. M. Mukundan. 3. K. Santhanam.

Half Mile Race. 1. T. M. Kini. 2. Zainulabedeem. 3. N. V. Srinivasan.

Javelin Throw. 1. M. Mukundan. 2. K. Santhanam. 3. P. K. S. Mani.

Half Mile Race (Invitation). 1. P. Nagaswami (Central Recruits School). 2. Dominic (Government College High School).

120 Yds. Hurdles (The Rao Bahudur Ramaswami Sivan Cup). 1. T. M. Kini. 2. M. Ramaiah. 3. M. Mukundan.

Old Boys' Race (100 Yds. Handicap). 1. A. M. Kulandai. 2. S. Varadarajan.

1 Mile Race (The Anstead Cup). 1. T. M. Kini. 2. Zainulabedeem. 3. Sreshta.

Inter-Tutorial Relay Race (The Chunampet Shield). Mr. Lakshmipathy's wards,

Obstacle Race. 1. P. K. S. Mani. 2. T. P. S. Nainar. 3. P. S. Srinivasan.

Inter-Tutorial Tug-of-War (The Ramanad Shield). Dr. J. S. Patel's Wards.

Pole Vault. N. V. Srinivasan.

Championship (Vengail Krishnan Nayanar's Cup). M. Mukundan.

College News & Notes.

Students' Corner. On 14-7-37 the students of the 2nd and 3rd year classes gave a welcome tea to the 1st year and short course students. The members of the teaching staff, the tutors, etc., took part in the function. The representatives of the 2nd and 3rd year students welcomed the freshers. The representative of the 1st year students thanked the senior students.

A portrait of Mr. G. Krishnaswami Mudaliar, G. M. V. C., who was Lecturer in Animal Hygiene at the College and retired from service recently, was presented by his students to the College and was unveiled on the occasion by Mr. R. C. Broadfoot, the Principal.

Games. After a temporary lull due to the College Day celebrations all the games are in full swing. Cricket in particular has become increasingly popular due to the presence of Mr. C. Ramaswami, the Indian Test cricketer, who is now posted to Coimbatore and is residing on the College estate.

College Day Cricket Match. The usual match between officers and students was played on the 25th July. Great interest was centred round the game due to the inclusion of Mr. Ramaswami in the officers' team. The officers batted first and declared at 163 for 9, thanks to a great innings by Mr. Ramaswami, who was unbeaten with 110 to his credit. For the students the bowling honours were shared by Dinker Rao (4 for 41), Kothandaraman (2 for 35) and Mahabala Shetty (2 for 12). The students started their innings disastrously losing 3 wickets for 9 runs but a determined stand between Kothandaraman and Dinker Rao raised the score to 49 before they were separated. When stumps were drawn the students had made 78 runs for 7 wickets. Dinker Rao's contribution was 38 runs and Kothandaraman's 22. For the officers, Ramaswami took 3 wickets for 14 runs, Vasudevan 2 for 21 and Varadarajan 1 for 8.

League Cricket. Two matches were played in connection with the Y. M. C. A. Cricket Tournament for the Rhondy Shield. The first was against the Government College and played on the Agricultural grounds. The visitors batted first and made 111 runs, the chief run getters being Padbhanabhan (28), Subramaniam (22) and Srinivasan (21). For the home team Dinker Rao excelled in bowling and took 7 wickets conceding only 24 runs. Other bowlers did not strike form. Our college replied with 119 runs. The finish was very exciting as our team had made only 80 runs for 5 wickets but two more wickets fell at 93 and the 8th and 9th wickets were down at 98 and 99 runs respectively. Mukundan played a very plucky innings and placed the issue beyond doubt by hitting two boundaries in succession.

The second match of the tournament was against the Stanes High School. Our team was considerably strengthened by the addition of Mr. C. Ramaswami. The school scored 55 runs to which Keir and Bird contributed 15 and 13 runs respectively. The bowling honours were even. Mukundan took 3 wickets for 15 runs, Dinker Rao and Kothandaraman took 2 each for 12 and 22 runs respectively. Varadarajan claimed 1 for 3 runs. The college replied with 236 runs. Ramaswami made 59, Kothandaraman 36, Mahabala Shetty 35 (retired), Mukundan 24, Varadarajan and Babu 22 each and Shiva Rao 12. In their second venture, the school team made 93 runs for 4 wickets. The college thus won the match comfortably.

Football. A match was played on 28-7-37 between the officers and the students. The students outpaced the officers and won by 4 goals to 1. On 5-8-37 a friendly match was played against the Government College. The Government College won by 2 goals to nil.

Abraham Memorial Football Tournament. The first game in connection with the Abraham Memorial Tournament was played against the P. S. G. Industrial Institute on 9-8-37. Our college won by 3 goals to nil. The second match was against the Municipal High School on 13-8-37. Our team scored first but the equalizer came in the second half. Extra time was allowed and the Municipal High School took the lead by scoring an extra goal.

Agricultural College students to the rescue of villagers. On Friday, the 30th July 37, when the final year students were returning after a village enquiry in Peelamedu, they observed fire breaking out in a small hamlet. Immediately, led by Mr. V. Suryanarayana, Assistant Lecturer in Agriculture, they set about bringing the fire under control; with the arrival of the Municipal fire engine the fire was put out without any appreciable loss of property. The villagers thanked the students for their timely help.

The Fieldmen's Association of the Madras Agricultural Department. A general body meeting of the association was held on the 4th August 1937 with M. R. Ry. Rao Bahadur G. N. Rangaswami Ayyangar Avl., in the chair. The following office bearers were elected for 1937-38: Mr. S. Gnanaprakasam Pillai, President, Mr. K. Raghavan, Secretary, Mr. C. K. Kuppamuthu Pillai, Assistant Secretary and Treasurer, and Messrs. D. Devasirvatham, C. S. Narayanaswami, V. Narayana Ayyar and C. R. Venkataraman, Committee Members.

The Association of Economic Biologists. Under the auspices of the association Mr. Le Pelly, Entomologist, Kenya, delivered an interesting lecture on "Agricultural conditions in Kenya with special reference to insect pests" on Monday the 17th August 1937.

Weather Review—JUNE 1937.

RAINFALL DATA

Division	Station	Actual for month	Departure from normal	Total since January 1st	Division	Station	Actual for month	Departure from normal	Total since January 1st
Circars	Gopalpore	2.9	-2.9	15.0	South	Negapatam	...	-1.3	8.9
	Calingapatam	2.9	-1.8	9.9		Aduthurai *	1.80	+0.5	6.0
	Vizagapatam	2.1	-2.8	10.0		Madura	0.20	-1.2	2.5
	Anakapalli *	2.6	-2.5	14.8		Pamban	...	-0.1	10.8
	Samalkota *	1.2	-3.6	10.6		Koilpatti	0.1	-0.4	7.7
	Maruteru *	1.2	-2.4	5.6		Palamkottah	...	-0.6	6.8
	Cocanada	3.7	-0.8	10.9	West Coast	Trivandrum	6.0	-7.4	22.7
	Masulipatam	1.4	-3.1	6.8		Cochin	23.7	-4.8	39.1
	Guntur *	0.7	-2.8	4.5		Calicut	23.7	-10.4	34.4
Ceded Dists.	Kurnool	1.5	-1.4	5.9		Pattambi *	18.0	-6.4	25.3
	Nandyal *	3.7	-1.0	10.8		Taliparamba *
	Hagari *	0.2	-2.0	4.5		Kasargode *	36.7	-1.7	47.9
	Bellary	...	-1.9	5.8		Nileshwar *	28.6	-13.2	36.2
	Anantapur	3.8	+1.8	10.1		Mangalore	34.5	-2.3	41.9
	Rentachintala	5.6	...	12.4	Mysore and Coorg	Chitaldrug	0.8	-2.0	3.6
	Cuddapah	2.0	-0.9	7.3		Bangalore	3.0	+0.2	16.5
	Anantharajupet *	1.1	-2.8	5.7		Mysore	1.6	-1.3	16.9
Carnatic	Nellore	0.6	-0.7	30.5		Mercara	17.1	-5.2	28.7
	Madras	1.7	-0.2	4.4	Hills	Kodaikanal	3.3	-0.8	22.1
	Palur *	0.1	-1.8	4.2		Coonoor	3.5	...	28.3
	Tindivanam *	0.3	-1.9	3.7		Ootacamund *	4.1	-1.0	20.3
	Cuddalore	0.3	-1.3	3.9		Nanjanad *	3.9	-4.2	15.8
Central	Vellore	3.6	+1.3	8.7					
	Salem	4.6	+1.5	10.1					
	Hosur *	2.09	-0.8	17.36					
	Coimbatore	0.3	-1.4	7.1					
	Coimbatore								
	A. C. & R. I. *	0.2	-1.2	10.0					
	Trichinopoly	1.0	-0.4	10.8					

* Meteorological Stations of the Madras Agricultural Department.

© From average rainfall for the month calculated upto 1935 published in Fort St. George Gazette.

The Bay of Bengal branch of the monsoon which was active in the neighbourhood of Ceylon and in the south and central Bay in the beginning of the first week became active and strong later, and caused widespread thunder rains in north east India. The Arabian Sea branch of the monsoon, which made a feeble advance in the beginning of the first week on the Malabar Coast, became established during the second week and remained active till the end of the month in Malabar, Kanara and Konkan.

Fairly widespread thundershowers have occurred in South Deccan, Mysore, South Madras Coast, North Madras Coast, Malabar, Konkan, and in the interior of the Peninsula, during the second and third week of the month.

Rainfall was in large defect throughout the Peninsula and markedly so in the Circars, the Ceded Districts and the West Coast.

The chief falls reported were:—

Kasargode	5.05"
Cochin.	5" (on 3rd June).

Weather Report of the Research Institute Observatory.

Report No. 6/37.

Absolute maximum in shade ...	95° F.
Absolute minimum in shade ...	71.0° F.
Mean maximum in shade ...	89.2° F.
Departure from normal ...	Nil.
Mean minimum in shade ...	75.8° F.
Departure from normal ...	+2.7° F.
Total rainfall for the month ...	0.24"
Departure from normal ...	-1.1"
Heaviest fall in 24 hours ...	0.08"
Total number of rainy days ...	2 days.
Mean daily wind velocity ...	6.0 m. p. h.
Mean humidity at 8 hours ...	68.5%
Departure from normal ...	-0.8%

Summary. Rainfall was in large defect. The appearance of the monsoon was noticed in the beginning of the month but was not active. The mean minimum was in excess by 2.7° F while the mean maximum and humidity were about the normal. Skies were heavily clouded.

P. V. R. & P. G.

JULY 1937.

RAINFALL DATA

Division	Station	Actual for month	Departure from normal	Total since January 1st	Division	Station	Actual for month	Departure from normal	Total since January 1st
			@					@	
Circars	Gopalpore	7.6	+0.7	22.6	South	Negapatam	0.8	-1.1	9.7
	Calingapatam	4.9	-0.4	14.8		Aduthurai *	0.3	-1.1	6.2
	Vizagapatam	1.5	-3.0	11.5		Madura	Nil.	-1.9	2.5
	Anakapalli *	5.0	-0.4	19.8		Pamban	0.2	-0.4	11.0
	Samalkota *	5.5	-1.8	16.1		Koilpatti	0.1	-0.6	7.8
	Maruteru *	4.2	-4.5	9.9		Palamkottah	0.1	-0.3	6.9
	Cocanada	6.3	+0.5	17.2	West Coast	Trivandrum	11.0	+3.6	33.7
	Masulipatam	7.1	+0.7	13.9		Cochin	45.0	+22.2	84.1
Ceded Dists.	Guntur *	9.2	+3.4	13.6		Calicut	59.0	+28.8	93.4
	Kurnool	6.2	+1.4	12.1		Pattambi *	32.3	+7.5	57.6
	Nandyal *	7.5	+2.1	18.2		Taliparamba *
	Hagari *	1.1	-1.1	5.6		Kasargode *	78.0	+39.6	126.0
	Bellary	1.5	-0.4	7.3		Nileshwar *	78.4	+37.8	114.6
	Anantapur	1.7	-1.7	11.8		Mangalore	65.6	+28.5	107.5
	Rentachintala	4.9	...	17.3	Mysore and Coorg	Chitaldrug	2.3	-0.7	5.9
	Cuddapah	2.5	-1.4	9.8		Bangalore	3.7	-0.4	20.2
Carnatic	Anantharajupet *	6.6	+4.3	13.3		Mysore	2.1	-0.4	19.0
	Nellore	3.1	+0.3	33.6		Mercara	57.7	+16.8	86.4
	Madras	3.6	-0.3	8.0	Hills	Kodaikanal	3.4	-1.6	25.5
	Palur *	2.5	-0.1	6.8		Coonoor	3.4	...	31.7
	Tindivanam *	1.7	Nil	5.3		Ootacamund *	8.5	+2.7	28.8
	Cuddalore	2.2	-0.9	6.1		Nanjanad *	9.5	-1.7	25.3
Central	Vellore	1.9	-3.4	10.6					
	Salem	1.7	-2.1	11.8					
	Hosur *	1.9	-0.9	19.3					
	Coimbatore	1.0	-0.5	8.1					
	Coimbatore								
	A. C. & R. I. *	1.5	+0.2	11.5					
	Trichinopoly	0.7	-0.9	11.5					

* Meteorological Stations of the Madras Agricultural Department.

@ From average rainfall for the month calculated upto 1935 published in Fort St. George Gazette.

Both the Arabian Sea and the Bay of Bengal branches of the monsoon were generally active throughout the month.

The monsoon was vigorous in Malabar, North Madras coast and South East Madras. Thunder showers occurred during the second week of the month at many places in the central part of the country.

On the 2nd, conditions became unsettled in the north-west angle of the Bay of Bengal, became less marked on the 3rd, and disappeared the next day,

A depression formed on the 11th off Puri. This depression moved on to Raipur and took a northerly course and then a north-westerly direction and filled up over Kotak on the 16th. This depression caused heavy rainfall along its track.

A third depression of the Bay of Bengal formed on the 22nd and moving in a north-westerly direction crossed the coast near Chandbali and Balasore on the 24th lay as a deep depression over the Central Provinces on the 25th and filled up on the 27th after causing heavy rainfall along its track.

The rainfall was markedly above normal in the West Coast and the Hills. It was in moderate excess in parts of the Ceded Districts and was below normal in the Central and Southern districts.

The chief falls recorded were :—

Mangalore	5.50" on the 2nd.
Mercara	5.30" " 12th.
Kasargod	6.95" " "
Nileshwar	8.38" " "
Calicut	10.00" " 18th.

The maximum temperatures were below normal in most places and normal in others; the highest temperature recorded being 102°F at Madura, Nellore, Cuddalore and Rentachintala.

Weather Report of the Research Institute Observatory.

Report No. 7/37.

Absolute maximum in shade	...	90.8°F.
Absolute minimum in shade	...	68.5°F.
Mean maximum in shade	...	85.3°F.
Departure from normal	...	- 1.8°F.
Mean minimum in shade	...	74.6°F.
Departure from normal	...	+ 2.6°F.
Total rainfall for the month	...	1.47"
Departure from normal	...	+ 0.2"
Heaviest fall in 24 hours	...	0.6" recorded on 22nd.
Total number of rainy days	...	5
Mean daily wind velocity	...	5.4 m. p. h.
Mean humidity at 8 hours	...	72%
Departure from normal	...	+ 0.6%

Summary. The monsoon was generally active. The rainfall recorded was slightly in excess of the normal. The heaviest rainfall was recorded on the 22nd. The skies were heavily clouded and the mean humidity was slightly above the normal. The mean maximum temperature was below normal by 1.8°F while the mean minimum was 2.6°F above the normal.

P. V. R. & F. L. D.

Departmental Notifications.

1. Promotions.

Mr. C. S. Namasivayam Pillai Avl., Lower subordinate, from V grade to IV grade with effect from 16th Septembar 1936.

2. Transfers.

Name of Officers.	Transferred	
	From	To
Mr. R. Vasudeva Rao	F. M. Samalkota	A. D. Madras.
„ T. Rangabrahma Rao	A. R. S. Samalkota	A. D. Tanuku.
„ K. V. Chalpati Rao	A. D. Kovvur	A. D. Tanuku.
„ P. P. Syed Muhammad	A. D. Co. 2 Scheme	To Chemistry section.
„ G. Doriswami Naidu	A. D. Co. 2 Scheme	F. M. Sriuguppa.
„ P. N. Muthuswami	A. D. Harur	A. D. VI Circle.
„ C. S. Sankaranarayana Iyer	F. M. Nanjanad	A. D. Coimbatore.
„ B. G. Narayana Menon	A. D. Coimbatore	F. M. Nanjanad.
„ G. V. Narayana	Oilseeds Section, Coimbatore.	A. R. S. Kasaragod.
„ M. M. Krishna Marar	F. M. Kasaragod	Oilseeds Section, Coimbatore.
„ P. Kannan Nambiar	A. D. Salem	A. D. Cannanore.
„ K. Govindan Nambiar	A. D. Cannanore	F. M. Taliparamba.
„ E. Kunhappa Nambiar	F. M. Taliparamba	A. D. Tellicherry.
„ P. A. Narayanan Nambiar	A. D. (on leave)	F. M. Taliparamba.
„ T. Krishna Reddy	A. D. Dhone	A. D. Koilkuntla.
„ Y. Venkataswami	A. D. Koilkuntla	A. D. Dhone.
„ A. Krishnaswami Iyer	A. D. Kurnool	A. D. Kodaikanal.
„ K. Narayanan Nair	A. D. Co. 2 Scheme	A. D. Namakkal.

3. Leave.

Name of officers.	Period of leave.
Mr. Y. V. Narayanaiah, Asst. Chemistry Section.	l. a. p. from 5th August to 2nd October '37.
„ P. Gopalakrishnan, Asst. Chemistry Section.	l. a. p. from 5th August to 3rd October '37.
„ A. Subramaniam, A. D. Narasipatam.	extension of l. a. p. for 3 months.
„ E. K. Govindan Nambiar, F. M. Taliparamba.	l. a. p. for one month from 9th August '37.
„ N. Ramadoss, A. D. Srungavarapukota.	Extension of l. a. p. on m. c. for one and half months from 1st August '37.
„ S. Dharmalingam Mudaliar, Asst. Paddy Section.	l. a. p. for one month from 11th August '37.
„ M. Subba Reddy, F. M. Kodur.	Extension of l. a. p. for one and a half months on m. c. from 15th August '37.

ADDITIONS TO THE LIBRARY DURING JULY 1937.

A. Books:

1. The Nature and Properties of Soils. Lyon T. L. and Buckman H. O. (1937).
2. Conservation of the Soil. Gustafson A. F. (1937).
3. Land Reclamation in Italy: Rural Revival in the Building of a Nation Tr. by O. R. Agresti. Longobardi C. (1936).
4. Soil Conservation—Bibliography Revised by J. Henderson. Wieland L. H. (1936).
5. Moisture and Farming in South Africa. Thompson W. R. (1936).
6. Profit from Fertilizers. Long H. C. Ed. (1936).
7. Rose Craft: A Guide to Rose Growing. Day H. A. (1937).
8. South African Garden Manual. Day H. A. (1936).
9. Pests of Fruits and Hops. Massee A. M. (1937).
10. Woolly Aphis Control. Greenslade R. M. (1936).
11. The Biological Control of Insects. Sweetman H. L. (1936).
12. Introduction to Research on Plant Diseases. Riker A. J. & Riker R. S. (1936).
13. Laboratory Outline in Filterable Viruses. Hyde R. R. (1937).
14. Sheep Farming. Fraser A. (1937).
15. Beekeeping in South Africa. Attridge A. J. (1933).
16. Fruit Markets in Eastern Asia. (California A. E. S. Bull. 493). Crocheron B. H. & Norton W. J. (1930).
17. The Freezing Preservation of Fruits, Fruit Juices and Vegetables. Tressler D. K. & Evers C. F. (1936).
18. Food Industries Manual. Tressler D. K. & Evers C. F. (1937).
19. The Technique of Marketing Research. Wheeler F. C. (1937).
20. Agricultural Prices. Thomsen F. L. (1936).
21. Sidgwick's Organic Chemistry of Nitrogen. Taylor Rev. T. W. J. & Baker W. (1937).
22. Fundamentals of Bacteriology. Frobisher M. (1937).
23. Proceedings of Conference on Statistical Methods of Sampling Agricultural Data. (U. S. Agri. Dep. Bur. Agri. Econ. Pub.) Frobisher M. (1936).
24. Panchayats in India. Drummond J. G. (1937).

B. Reports:

1. Travancore Agricultural & Fisheries Department Administration Report for 1111 M. E. (1936).
2. Report on the Administration of the Agricultural Department in the Cochin State for the Year 1111 (1935—36).
3. Annual Report of the Department of Horticulture Mysore State for the Year 1934—35.
4. Annual Report of the Department of Agriculture in the Bombay Presidency, 1935—36.
5. Annual Report of the Department of Agriculture, Gwalior Government for the Year 1935—36.
6. Summary of Proceedings of the Thirty-third Meeting of the Indian Central Cotton Committee, Bombay, held on the 17th & 18th August, 1936.
7. Annual Report of Tea Research Institute of Ceylon for the Year 1936.
8. East Mallang Research Station Annual Report for 1936.
9. Report of Oklahoma A. & M. College Agricultural Experiment Station for 1934—1936.

C. Special Publications:

10. The Silviculture and Management of the Bamboo. (Indian Forest Records N. S. Silvi. Vol. II, No. 4).
11. Report of the Motor Vehicles Insurance Committee 1936—37.
12. A Guide to Indian Cottons. (East India Cotton Association Pub.).
13. Proceedings of the Second Dearborn Conference of Agriculture, Industry and Science.
14. Bibliography on Soil Conservation. (U. S. Agri. Dep. Soil Conser. Ser. Pub.).
15. Proceedings of Conference on Statistical Methods of Sampling Agricultural Data. (U. S. Agri. Bur. of Agri. Econ. Pub.).
16. Survey of the Oil Content and Iodine Value of Western Canadian Flaxseed, 1936 Crop. (Grain Res. Lab. of Canada Pub.).
17. Rainfall Characteristics and Their Relation to Soils and Run-off. (American Society of Civil Engineers Pub.).
18. Soil Erosion in Iowa.
19. Orange County Lemon Production Cost Analysis, 1936. (California Agri. Extn. Ser. Pub.).
20. Orange Country Valencia Production Cost Analysis, 1936. (California Agri. Extn. Ser. Pub.).

D. Bulletins, Memoirs Etc.:

21. Further Tests on Indian Cottons with Different Systems of High Draft Spinning. *Ind. Cen. Cot. Com. Tech. Bul. Ser. A. 37.* 22. The Soils of the Rice Areas of the Gujranwala and Sheikhpora Divisions of the Upper Chenab Canal. *Punjab Irrigation Res. Inst. Res. Pub. Vol. III, No. 2.* 23. A Study of the Soil Profiles of the Punjab Plains with reference to their Natural Flora. *Punjab Irrigation Res. Inst. Res. Pub. Vol. III, No. 3.* 24. Crop Production in Frames. *Eng. Min. Agri. Bul. 65.* 25. Cider Apple Production. *Eng. Min. Agri. Bul. 104.* 26. Manuring of Fruit Crops. *Eng. Min. Agri. Bul. 107.* 27. Studies in Tropical Fruits. *Trinidad Imp. Col. of Trop. Agri. Mem. 4.* 28. (a) Citrus Wastage Investigations. *Union of S. Africa Agri. & For. Bul. 167.* (b) Report on an Economic Investigation into Farming in four Maize Districts of the Orange Free State 1928—30. *Union of S. Africa Agri. & For. Bul. 173.* 29. Report on a Visit to Northern Nigeria to study Mixed Farming. *Gold Coast Agri. Dep. Bul. 33.* 30. Tankage Its Value in Livestock and Poultry Feeding. *Dom. Canada Agri. Dep. Pub. 558.* 31. Investigations on the Occurrence and Inheritance of the Grass Clump Character in Crosses Between Varieties of *Triticum vulgare*. *Com. of Australia Coun. for Sci. & Ind. Res. Bul. 104.* 32. Methods of Wheat Breeding in China: Hybridization. *China National Agri. Res. Bur. Min. of Ind. Spl. Pub. 19.* 33. Plantation Operations of Landlords and Tenants in Arkansas. *Arkansas Agri. Exp. Stn. Bull. 339.* 34. Lysimeter Experiments—IV—Records for Tanks 17 to 24 during the years 1922 to 1933, and for tanks 13 to 16 during the years 1913 to 1928. *Cornell A. E. S. Mem. 194.* 35. Physiological Studies on *Rhizobium* Species. *Cornell A. E. S. Mem. 196.* 36. Soil and Plant Response to Certain Methods of Potato Cultivation. *Cornell A. E. S. Bul. 662.* 37. Influence of Storage Temperature and Humidity on Seed Value of Potatoes. *Cornell A. E. S. Bul. 663.* 38. Effect of Soil Reaction on Growth, Yield, and Market Quality of Potatoes. *Cornell A. E. S. Bul. 664.* 39. Orchard Terracing. *Clemson A. E. S. Bul. 97.* 40. Safe Drinking water. *Michigan A. Ext. Div. Bul. 173.* 41. The Nitrate Nitrogen in the Soil as Influenced by the Crop and the Soil Treatments. *Missouri A. E. S. Res. Bul. 250.* 42. Raising the Dairy Calf. *Missouri A. E. S. Res. Bul. 377.* 43. Acquiring Farm Ownership by Payments in Kind. *Missouri A. E. S. Res. Bul. 378.* 44. Determining the Tonnage of Hay in Long Stacks and Round Stacks. *Nevada Agri. Exp. Stn. Bul. 143.* 45. Analysis of the Business Operations of Cooperative Cotton Gins in Oklahoma, 1933—34. *Washington Farm Credit Adm. Bul. 12.* 46. Protection of Apples and Pears in Transit from the Pacific Northwest during the Winter Months. *U. S. Agri. Dep. Tech. Bul. 550.* 47. Soil and Water Conservation Investigations. *U. S. Agri. Dep. Tech. Bul. 558.* 48. Influence of Packing and Handling Methods on Condition of Apples Barreled for Export. *U. S. Agri. Dep. Tech. Bul. 559.* 49. The Effectiveness of Cultivation as a Control for the Corn Earworm. *U. S. Agri. Dep. Tech. Bul. 561.* 50. The Effect of Exposure in the Field on Grade, Strength, and Color of Raw Cotton. *Texas Agri. Exp. Stn. Bul. 538.* 51. The Tennessee Poultry House. *Tennessee Agri. Extn. Ser. Pub. 132.*

E. Circulars, Leaflets Etc.

52. Prevention of Virus Diseases of Greenhouse Grown Tomatoes. *Dom. of Canada Agri. Dep. Cir. 118.* 53. Prevention of Tobacco Mosaic in Ontario. *Dom. of Canada Agri. Dep. Cir. 119.* 54. Distribution of the Varieties and Classes of Wheat in the U. S. in 1934. *U. S. Agri. Dep. Cir. 424.* 55. Organization and Operation of Cooperative Irrigation Companies. *Washington Farm Credit Adm. Cir. 102.* 56. Home Drying of Vegetables and Fruits. *Utah Agri. Col. Ext. Ser. Cir. 87.*



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